

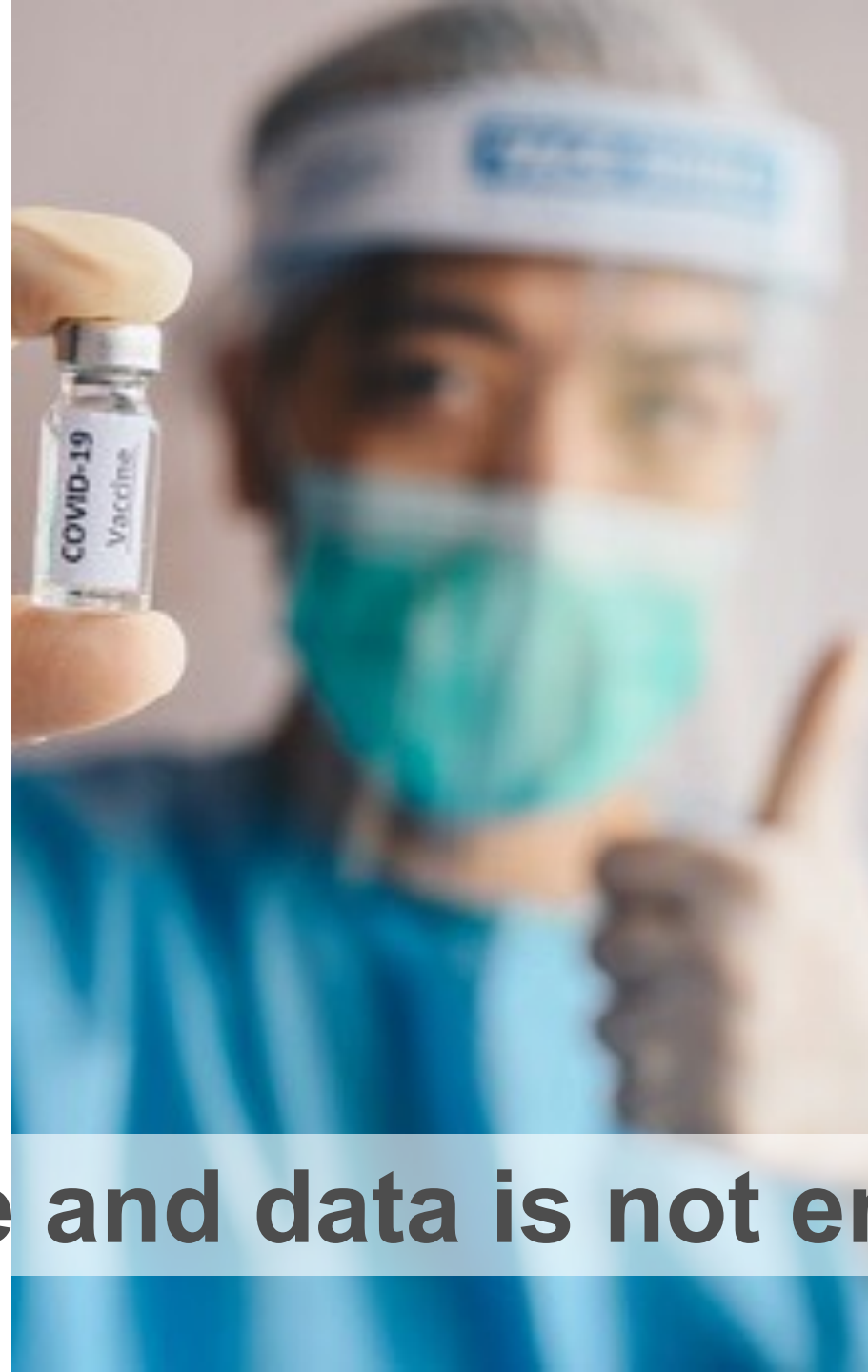


# JRC Week on Composite Indicators and Scoreboards

Opening & Introduction

*Michaela Saisana*

*2021 JRC Week on Composite Indicators and Scoreboards*



**Science and data is not enough**





*We are drowning in  
information, while starving  
for wisdom...  
E. O. Wilson*





Human Capital Index (World Bank) World Happiness Ranking (UN SDSN)

Education for all Development Index (UNESCO)

Global Slavery Index (Walk Free Foundation)

Human Development Index (UNDP)

World Press Freedom Index (Reporters Without Borders)

Better Life Index (OECD)

Living Planet Index (WWF)

Global Innovation Index (WIPO, INSEAD, Cornell)

Best Countries for Business (Forbes)

World Health Report (WHO)



# When it comes to Composite Indicators... ...polarized audience

**Enthusiastic supporters**, mostly from advocacy groups developing their own indices to advance a cause

**Skeptical economists and official statisticians** concerned by the subjective nature of the selection of variables, weights and aggregation

# When it comes to Composite Indicators... ...polarized audience

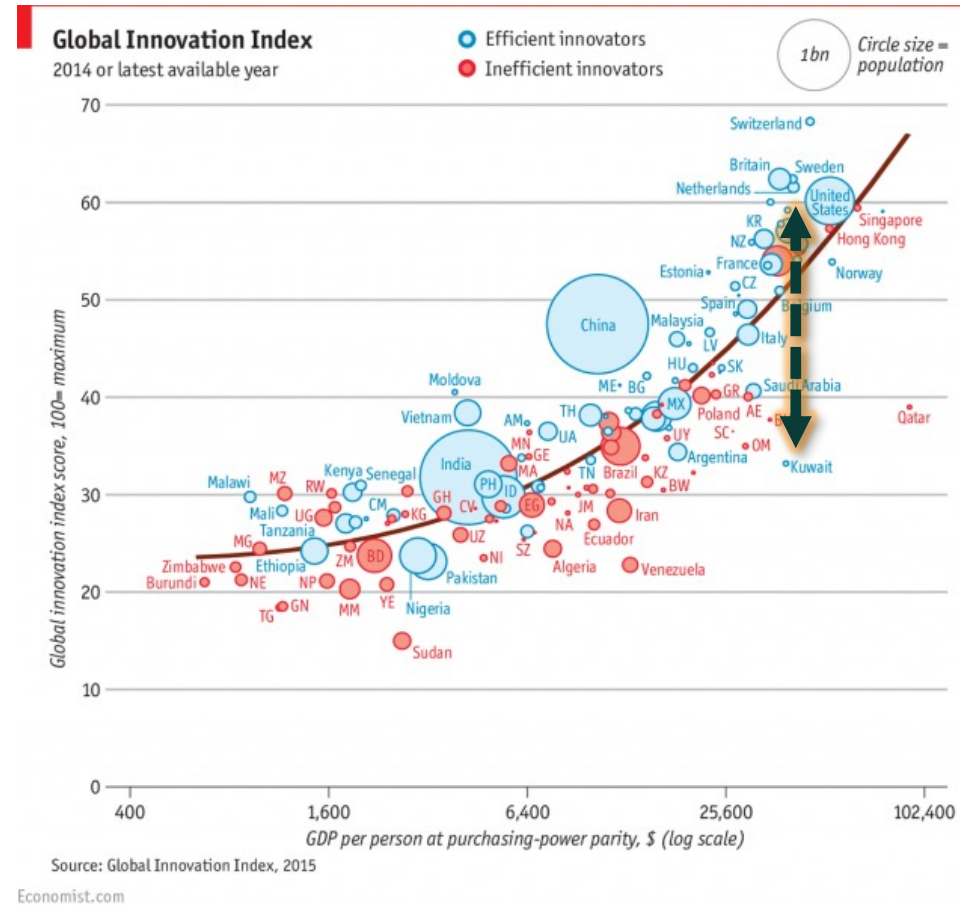
**Enthusiastic supporters**, mostly from advocacy groups developing their own indices to advance a cause

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# Global Innovation Index



- 1 index
- 2 sub-indices
- 7 pillars
- 21 sub-pillars
- 80+ indicators



GII

**GDP / Capita**

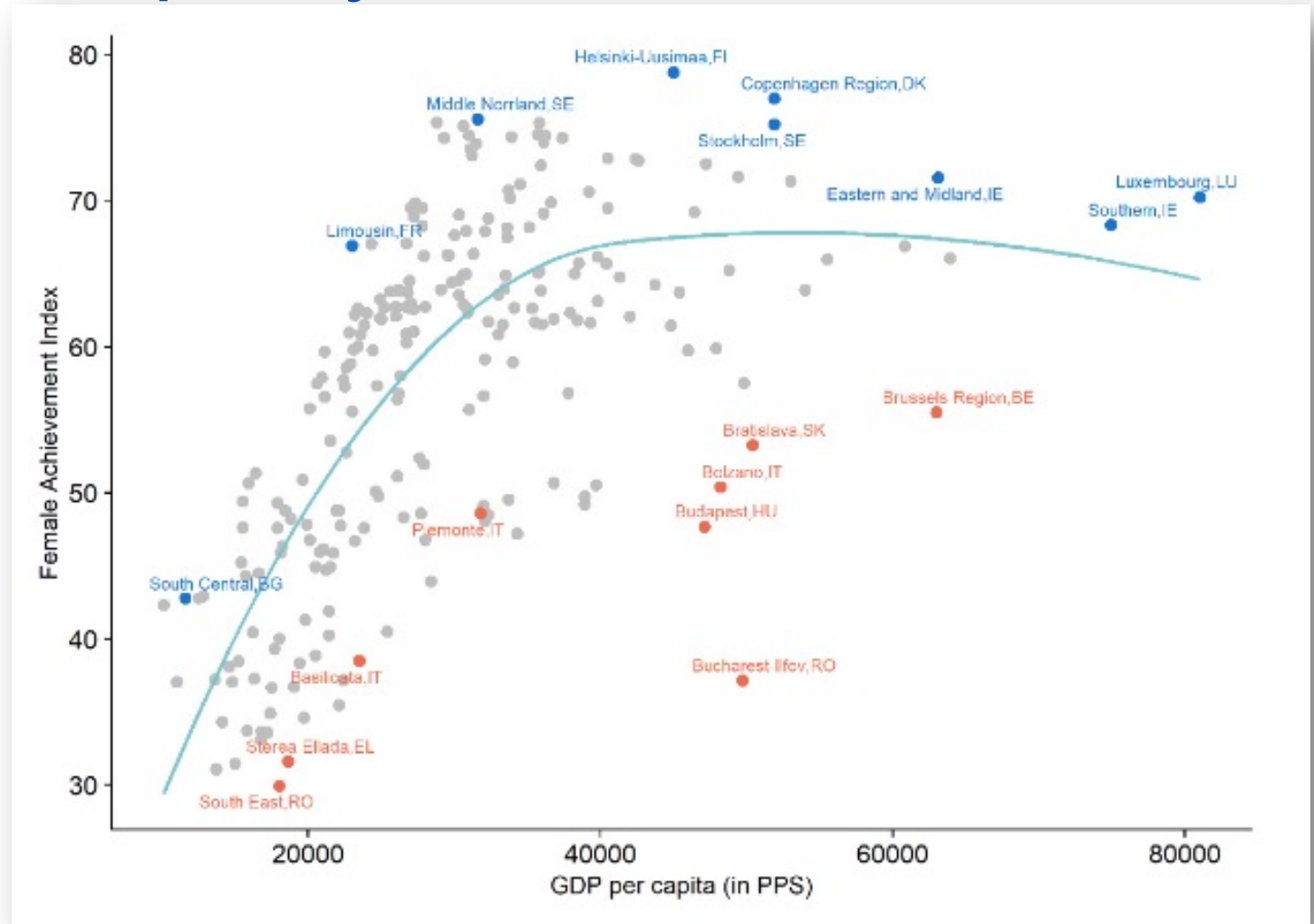


# Regional Gender Equality Monitor



## Female Achievement Index

- 7 pillars
- 30+ indicators



[LINK](#)

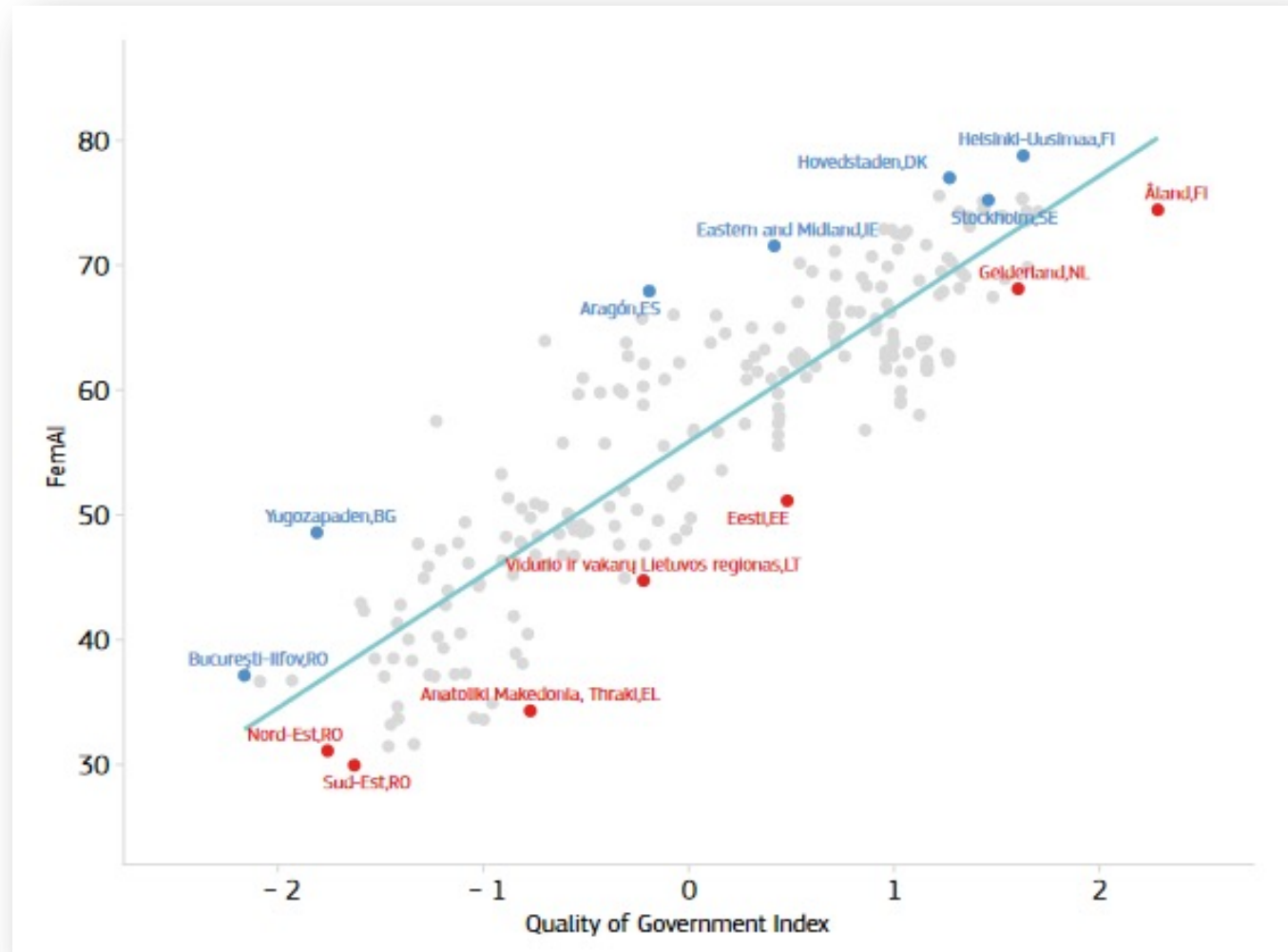
# Regional Gender Equality Monitor



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- 7 pillars
- 30+ indicators

[LINK](#)



# When it comes to Composite Indicators... ...polarized audience

**Enthusiastic supporters**, mostly from advocacy groups developing their own indices to advance a cause

**Skeptical economists and official statisticians** concerned by the subjective nature of the selection of variables, weights and aggregation



# Indices ... are they measurements without theory?

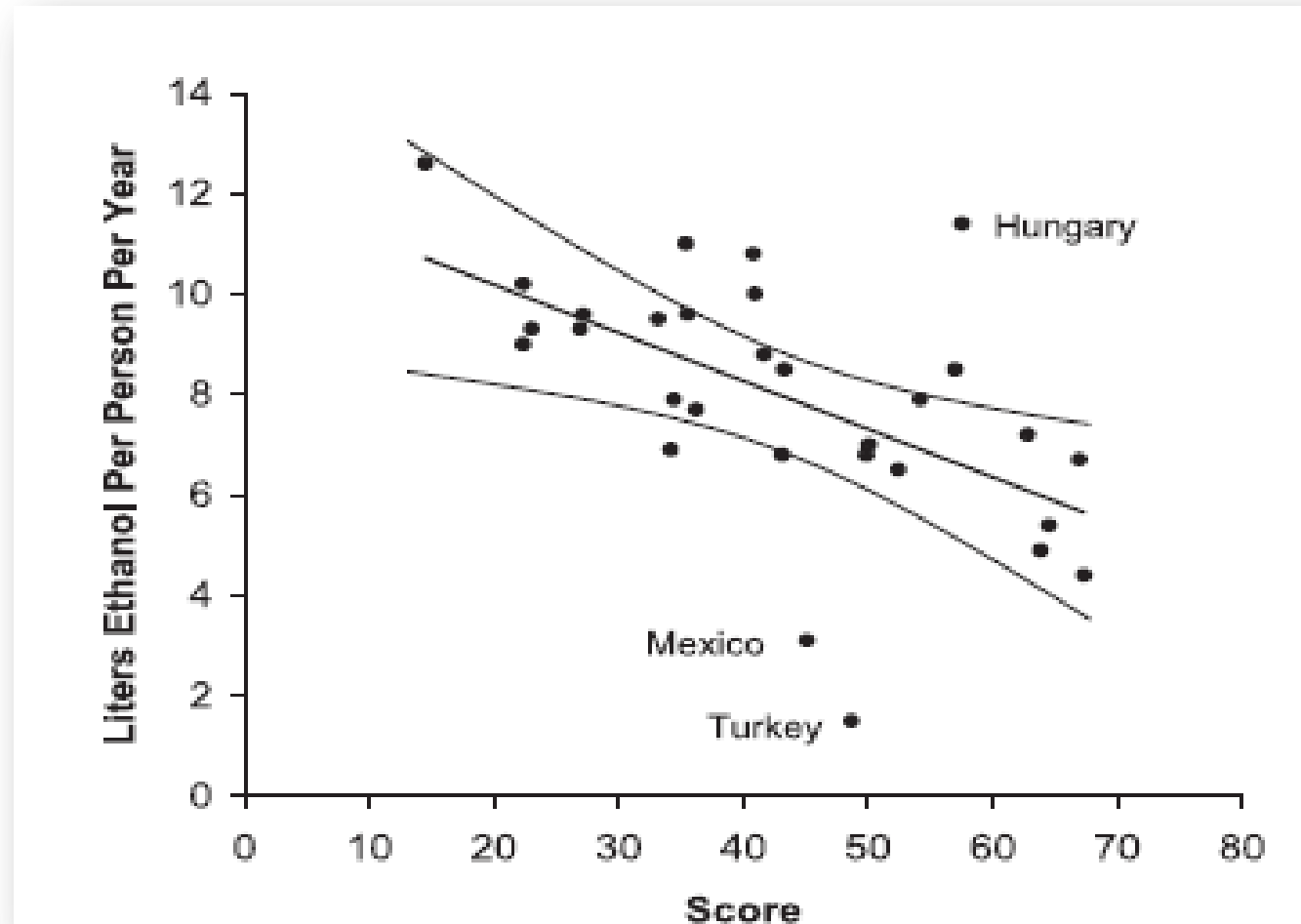
Domains	Ratings	Topics	Policies
Physical availability (32 points)	☆☆☆	Legal alcohol purchase age (y)	16, 17, 18, 19, 20+
	☆☆☆	Alcohol server liability for damages caused by actions of patrons	No, Yes
	☆☆	Restrictions on types of alcoholic beverages sold in retail stores	None; Partial government monopoly; Full government monopoly
	☆☆	Restrictions on density of stores selling alcoholic beverages in a given locale	None; On wine only; On wine and spirits; On wine, spirits, and beer
	☆☆	Restrictions on business hours for selling alcohol	None; On hours or days; On both hours and days
Drinking context (8 points)	☆☆	Community mobilization programs to increase public awareness of, and prevent alcohol problems	No, Yes
	☆	Mandatory training of alcohol servers to prevent and manage aggression	No, Yes
Alcohol prices <sup>a</sup> (24 points)	☆☆☆	Beer price index	0–0.29, 0.30–0.59, 0.60–0.89, 0.90+
	☆☆☆	Wine price index	0–0.9, 1.0–1.9, 2.0–2.9, 3.0+
	☆☆☆	Spirit price index	0–2.9, 3.0–5.9, 6.0–8.9, 9.0+
Alcohol advertising (3 points)	☆	Number of different media (print, broadcast, billboards) with advertising restrictions	0, 1, 2, 3
Motor vehicles (34 points)	☆☆☆	Random breath testing	None, <sup>b</sup> Rare, Occasional, Often, Very often
	☆☆☆	Legal blood alcohol limit—adult (mg/dl)	0.08+, 0.03–0.07, 0–0.02
	☆☆☆	Legal blood alcohol limit—youth (mg/dl)	0.04+, 0.02–0.03, 0–0.01
	☆☆	Mandatory penalty for exceeding legal limit	Fine, License suspension
	☆☆	Graduated licensing for young drivers	No, Yes

[Source: [Alcohol Policy Index](#), 2007, *PLoS Medicine*, 4(4):752-759]

# Indices ... are they measurements without theory?

## Alcohol Policy Index

- 5 pillars
- 16 indicators



Unlike the Alcohol Policy Index, **most composite indicators cannot be validated versus a ground truth**

[Source: [Alcohol Policy Index](#), 2007, *PLoS Medicine*, 4(4):752-759]

...and they have strong political and policy implications

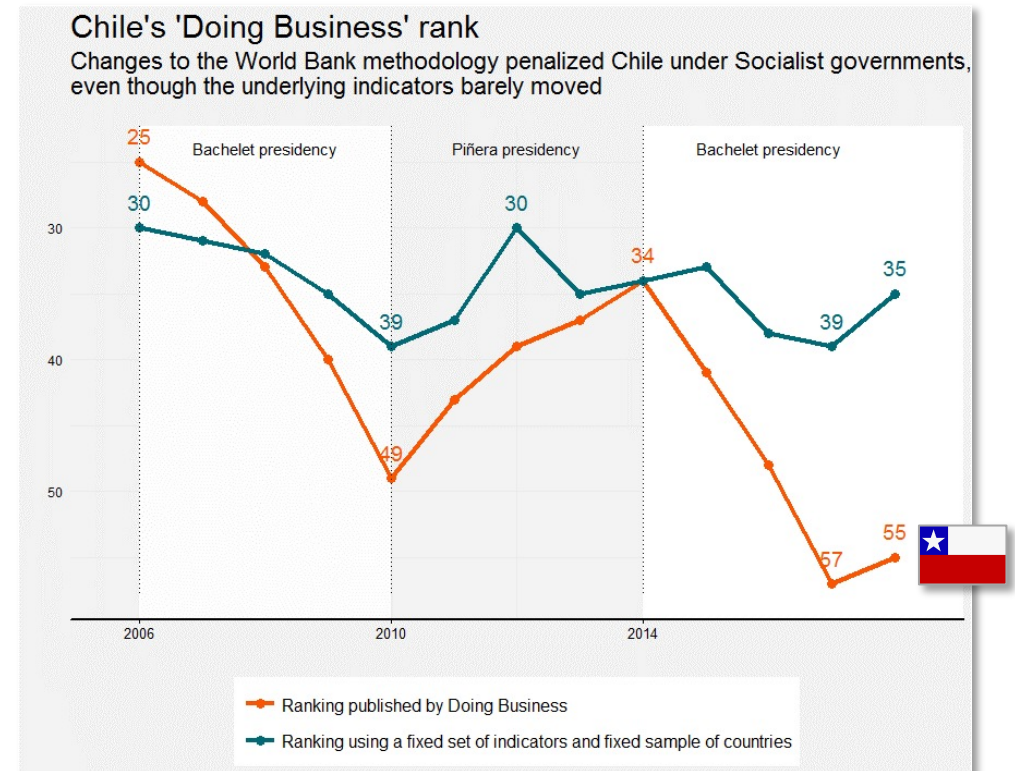


REUTERS  
BUSINESS NEWS  
JANUARY 25, 2018 / 12:25 AM / 8 MONTHS AGO



## World Bank economist Paul Romer quits after Chile comments

WASHINGTON (Reuters) - Paul Romer stepped down as the World Bank's chief economist on Wednesday after he came under fire for saying that Chile's rankings in a closely watched "Doing Business" report may have been deliberately skewed under socialist President Michelle Bachelet.



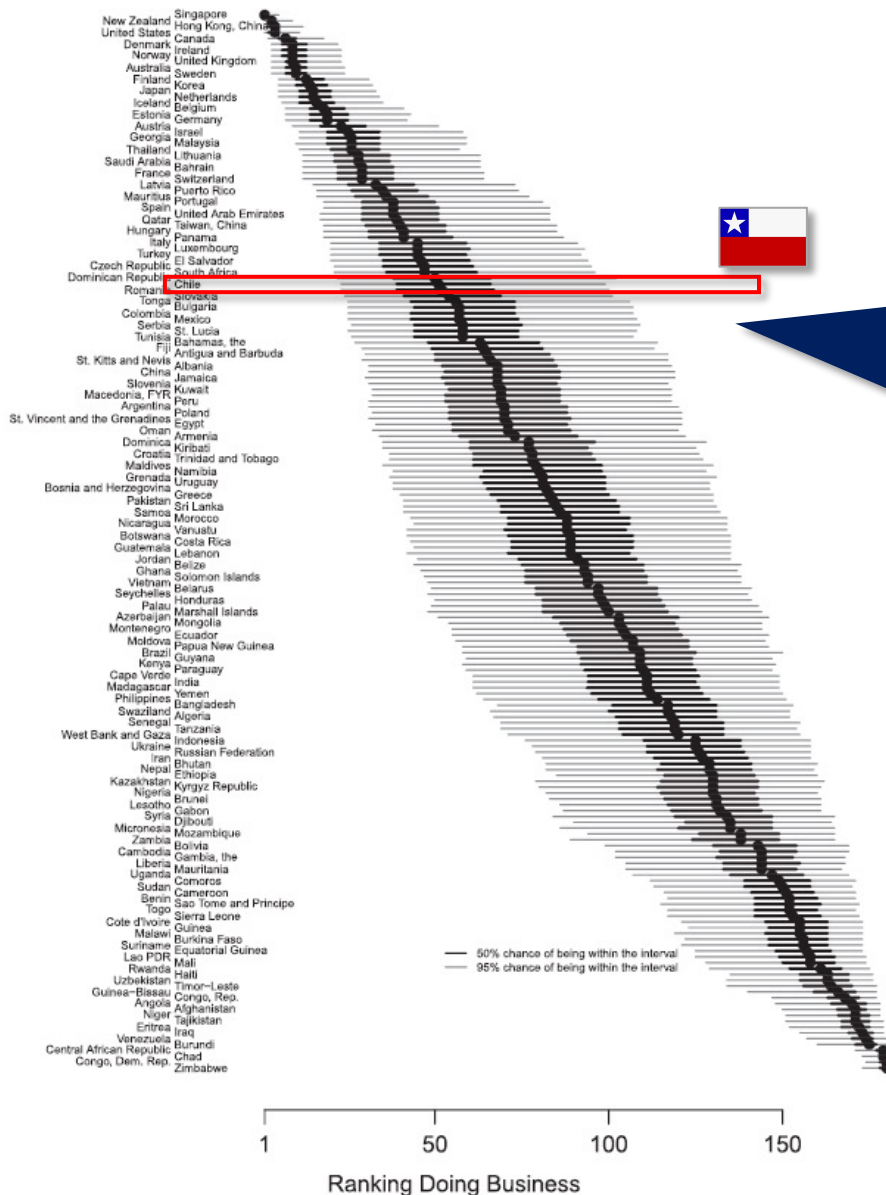
Source: Justin Sandefur and Divyanshi Wadhwa, based on data from [www.doingbusiness.org](http://www.doingbusiness.org) and World Bank "Doing Business" reports, 2006-2018.

URL (3 Oct 2018): <https://www.cgdev.org/blog/chart-week-3-why-world-bank-should-ditch-doing-business-rankings-one-embarrassing-chart>





## Uncertainty in Doing Business ranking

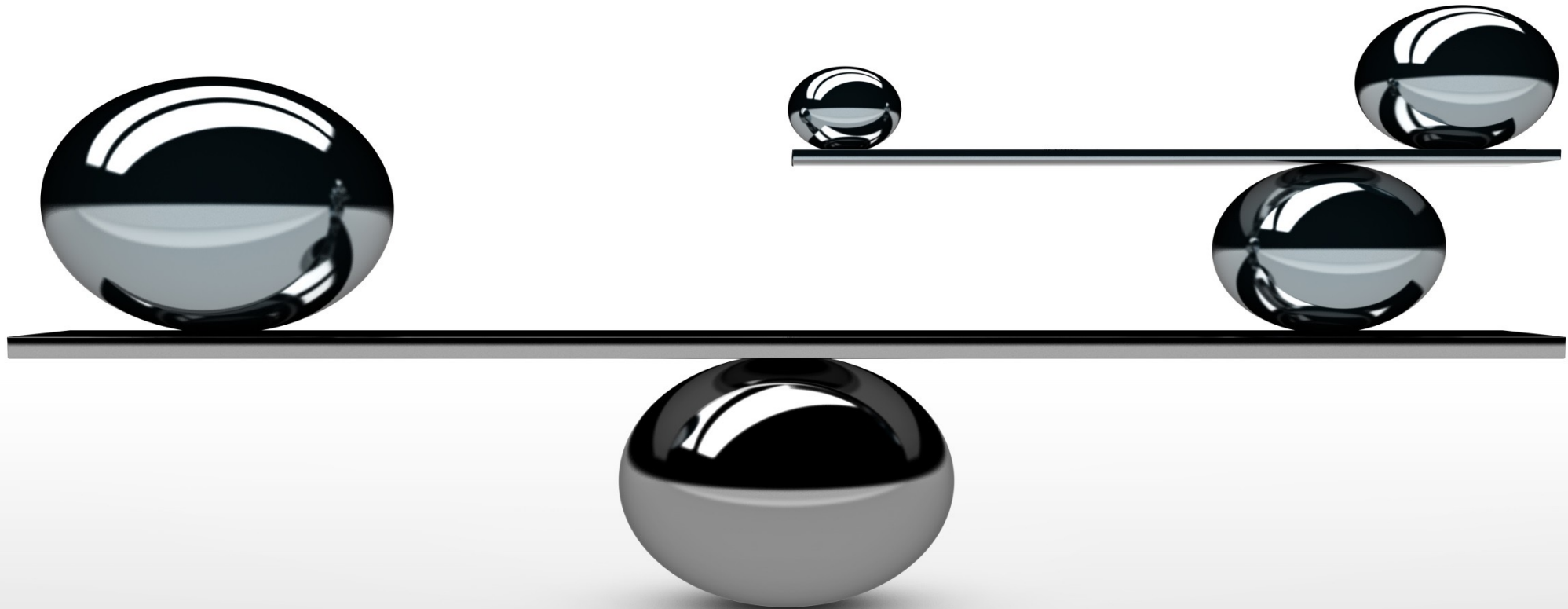


“Whether or not there was deliberate manipulation of its Doing Business Indicators, the Bank should better acknowledge the huge uncertainty about this index especially in the middle 80% of country rankings. Only top and bottom seem reliable.”  
(Ravallion, 2018)



Source: Høyland et al, 2012, “The tyranny of international index rankings” J Dev Eco 97(1) pp.1-14

*Building a composite indicator:  
a delicate balance between Science and Art*



# Competence Centre on Composite Indicators and Scoreboards

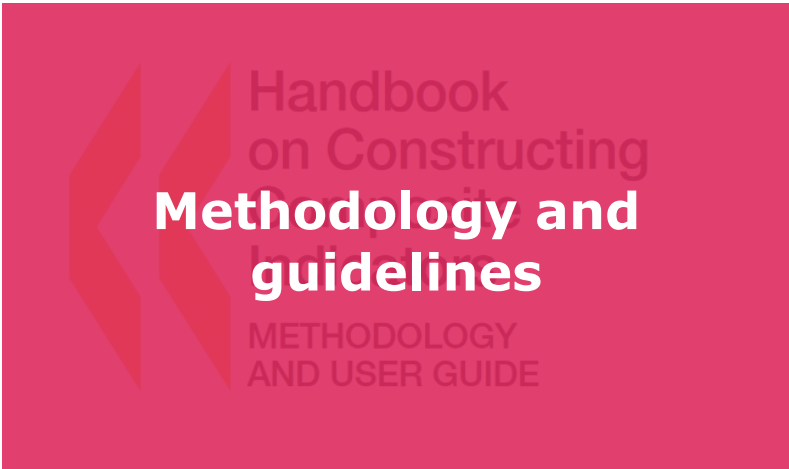


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Support to international  
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Handbook  
on Constructing  
**Methodology and  
guidelines**

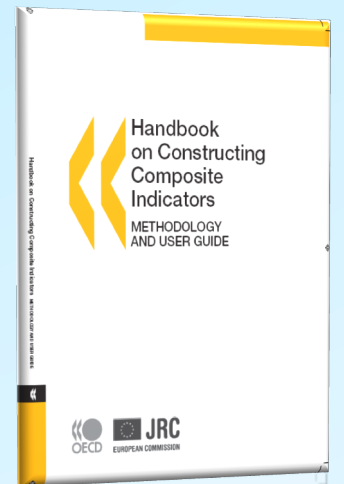
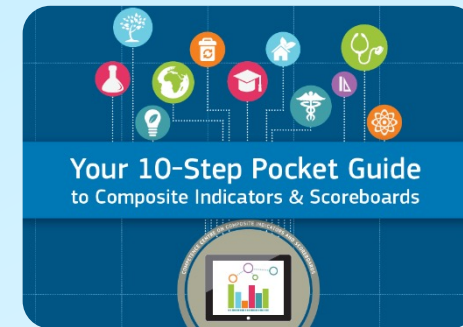
METHODOLOGY  
AND USER GUIDE



Training and  
Community of Practice



# 10 STEPS to build a Composite Indicator



# To aggregate or not to?

YES

## FACTOR 1: Limited Government Powers

- 1.1 Government powers are defined in the fundamental law
- 1.2 Government powers are effectively limited by the legislature
- 1.3 Government powers are effectively limited by the judiciary
- 1.4 Government powers are effectively limited by independent auditing and review
- 1.5 Government officials are sanctioned for misconduct
- 1.6 Government powers are subject to non-governmental checks
- 1.7 Transition of power is subject to the law

## FACTOR 2: Absence of Corruption

- 2.1 Government officials in the executive branch do not use public office for private gain
- 2.2 Government officials in the judicial branch do not use public office for private gain
- 2.3 Government officials in the police and the military do not use public office for private gain
- 2.4 Government officials in the legislative branch do not use public office for private gain

## FACTOR 3: Order and Security

- 3.1 Crime is effectively controlled
- 3.2 Civil conflict is effectively limited
- 3.3 People do not resort to violence to redress personal grievances

## FACTOR 4: Fundamental Rights

- 4.1 Equal treatment and absence of discrimination
- 4.2 The right to life and security of the person is effectively guaranteed
- 4.3 Due process of law and rights of the accused
- 4.4 Freedom of opinion and expression is effectively guaranteed
- 4.5 Freedom of belief and religion is effectively guaranteed
- 4.6 Freedom from arbitrary interference with privacy is effectively guaranteed
- 4.7 Freedom of assembly and association is effectively guaranteed
- 4.8 Fundamental labor rights are effectively guaranteed

## FACTOR 5: Open Government

- 5.1 The laws are publicized and accessible
- 5.2 The laws are stable
- 5.3 Right to petition the government and public participation
- 5.4 Official information is available on request

## FACTOR 6: Regulatory Enforcement

- 6.1 Government regulations are effectively enforced
- 6.2 Government regulations are applied and enforced without improper influence
- 6.3 Administrative proceedings are conducted without unreasonable delay
- 6.4 Due process is respected in administrative proceedings
- 6.5 The Government does not expropriate without adequate compensation

## FACTOR 7: Civil Justice

- 7.1 People can access and afford civil justice
- 7.2 Civil justice is free of discrimination
- 7.3 Civil justice is free of corruption
- 7.4 Civil justice is free of improper government influence
- 7.5 Civil justice is not subject to unreasonable delays
- 7.6 Civil justice is effectively enforced
- 7.7 ADRs are accessible, impartial, and effective

## FACTOR 8: Criminal Justice

- 8.1 Criminal investigation system is effective
- 8.2 Criminal adjudication system is timely and effective
- 8.3 Correctional system is effective in reducing criminal behavior
- 8.4 Criminal system is impartial
- 8.5 Criminal system is free of corruption
- 8.6 Criminal system is free of improper government influence
- 8.7 Due process of law and rights of the accused

## FACTOR 9: Informal Justice

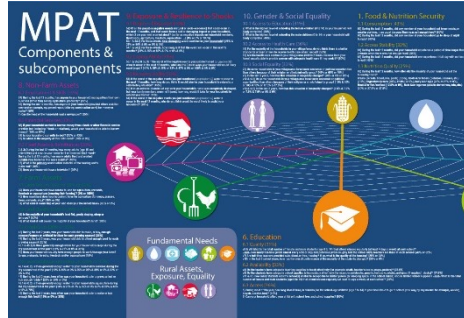
- 9.1 Informal justice is timely and effective
- 9.2 Informal justice is impartial and free of improper influence
- 9.3 Informal justice respects and protects fundamental rights

Rule of Law Index 2012  
by the World Justice Project

- No aggregation until 2012
- [JRC audit in 2012](#) revealed that: an overall index captures 81% of the variation in the key factors (Factors 1-8)
- An index is calculated since 2014

# To aggregate or not to?

**NO**



**Table 8. Pearson’s correlation coefficients between the ten MPAT Components**

	Food & Nutrition Security	Domestic Water Supply	Health & Healthcare	Sanitation & Hygiene	Housing & Energy	Education	Farm assets	Non-farm assets	Exposure & Res. to shocks
Domestic Water Supply	0.06								
Health & Healthcare	-0.13	0.35*							
Sanitation & Hygiene	-0.01	0.23	0.32*						
Housing & Energy	0.23	0.11	0.08	-0.04					
Education	0.10	0.19	0.18	0.07	0.20				
Farm assets	0.20	0.42*	0.26	0.21	0.16	0.14			
Non-farm assets	0.13	0.13	0.18	0.08	0.05	0.08	0.27*		
Exposure & Res. to Shocks	0.08	-0.01	-0.02	-0.07	0.14	-0.10	0.07	-0.14	
Gender Equality	0.08	0.21	0.04	-0.21	0.22	0.19	0.10	0.01	0.17

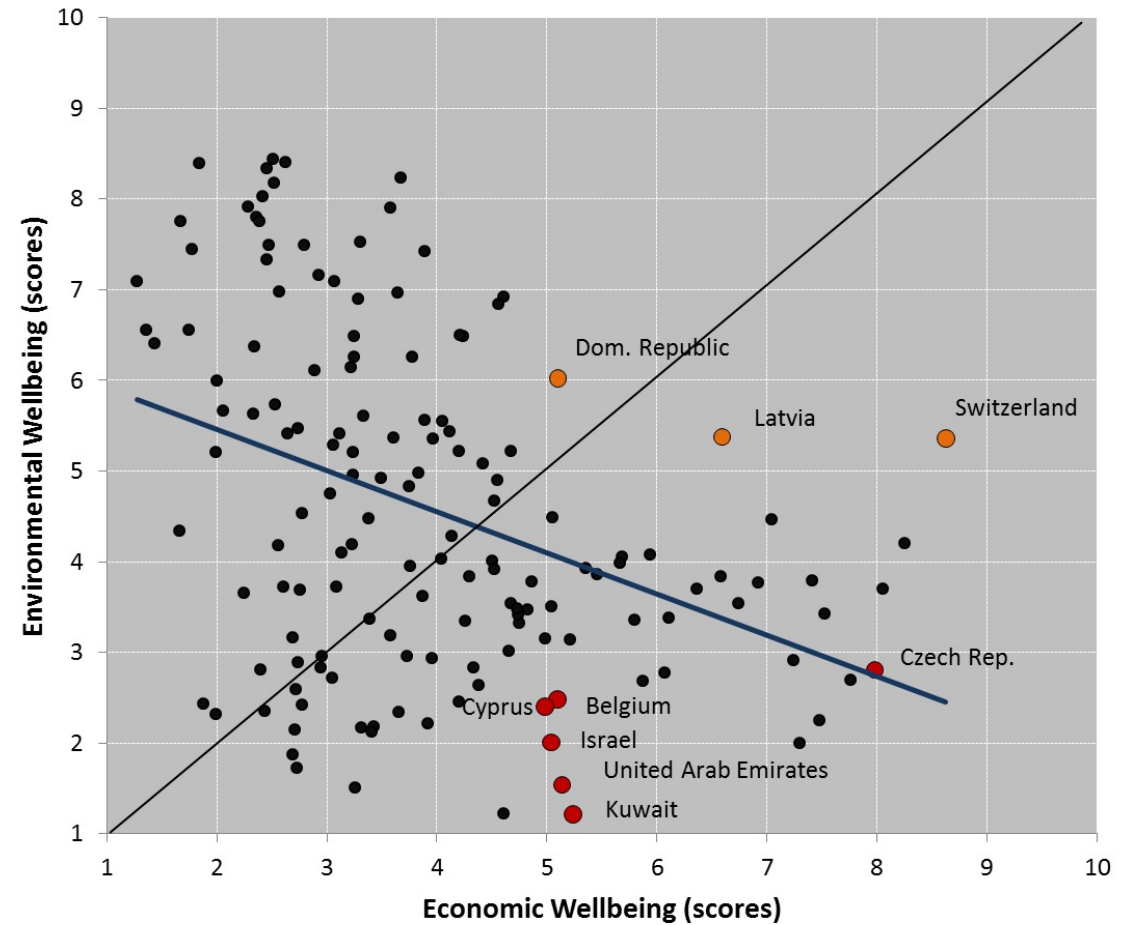
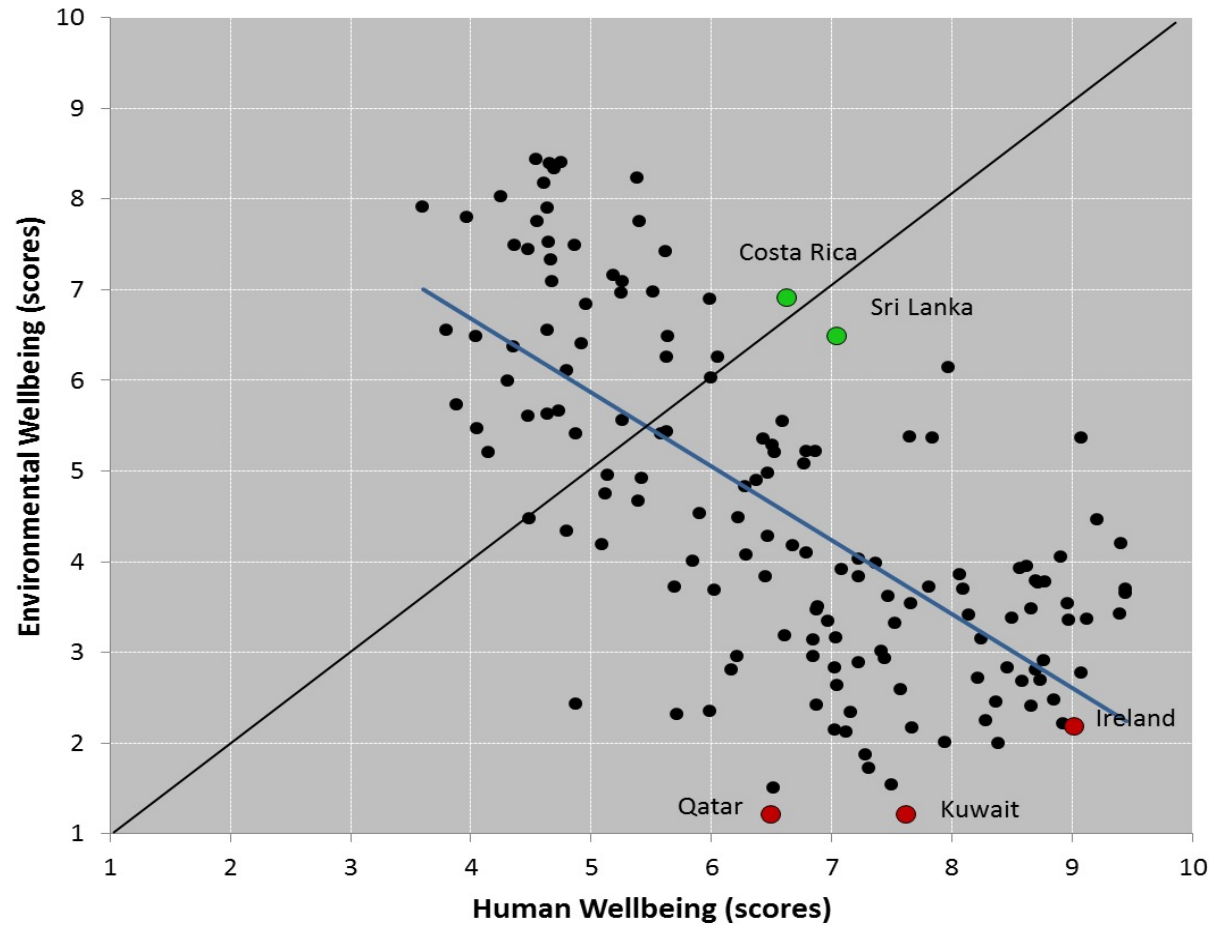
\* Significant coefficients are greater than 0.27 ( $p < 0.05$ ,  $n = 527$ )

“[...] a final composite indicator should not be seen as **a goal per se**. It is sometimes preferred to **stop** the aggregation procedure at the **components level** and not aggregate further. This was both **conceptually and statistically** confirmed in the case of the MPAT.

[Multidimensional Poverty Assessment Tool (MPAT), UN IFAD, [JRC audit 2010](#)]

# To aggregate or not?

YES but ...

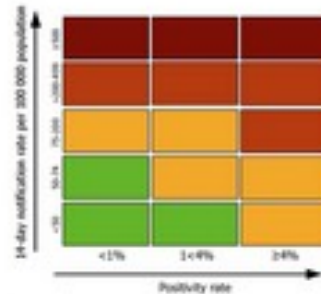




# Combined indicator: 14-day notification rate, testing rate and test positivity, updated 25 November 2021



14-day COVID-19 case notification rate per 100 000 population and test positivity, EU/EEA weeks 45 - 46



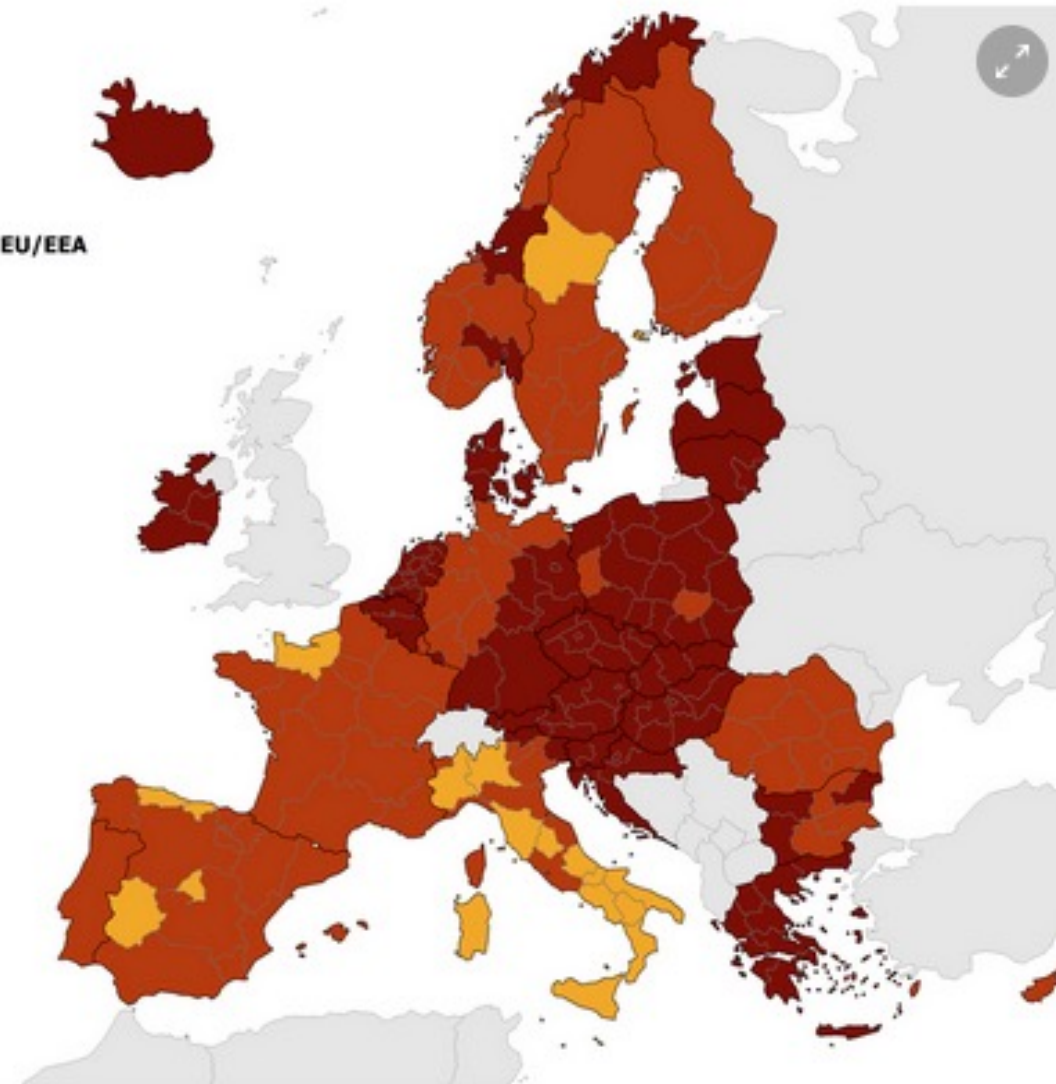
- Testing rate < 300 per 100 000 population
- No data available
- Not included

Regions not visible in the main map extent

- Azores
- Guadeloupe and Saint Martin
- La Reunion
- Martinique
- Canary Islands
- Guyane
- Madeira
- Mayotte

Countries not visible in the main map extent

- Malta
- Liechtenstein



Administrative boundaries: © EuroGeographics © UN-FAO © Turstat © Kartverket © Instituto Nacional de Estadística - Statistics Portugal. The boundaries and names shown on this map do not imply official endorsement or acceptance by the European Union. ECDC. Map produced on: 25 Nov 2021

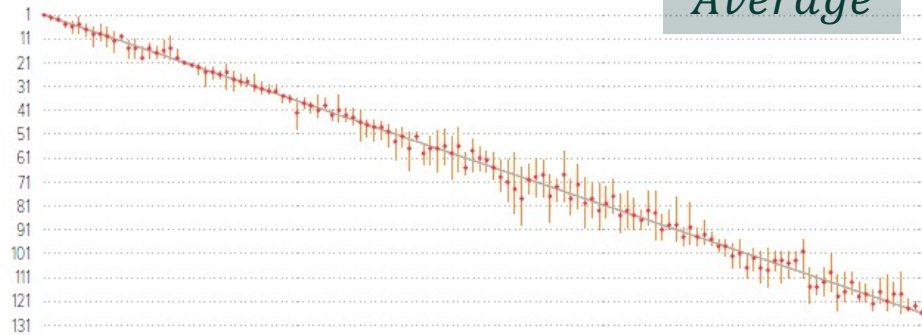


# Careful with ratios of composite indicators

## Input and Output sub-indices

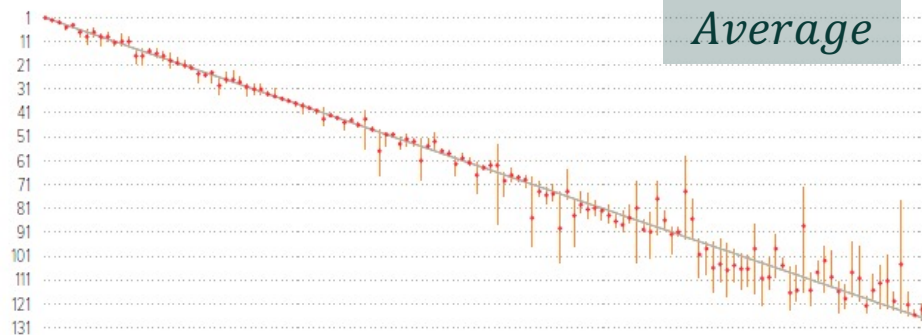
- ▲ GII 2018 Input ranks and interval of simulated ranks
- ▶ Countries/economies
- Median rank
- GII 2018 Input rank

Input rank vs. median rank, 90% confidence intervals



- ▲ GII 2018 Output ranks and interval of simulated ranks
- ▶ Countries/economies
- Median rank
- GII 2018 Output rank

Output rank vs. median rank, 90% confidence intervals



Fairly robust indices, but...

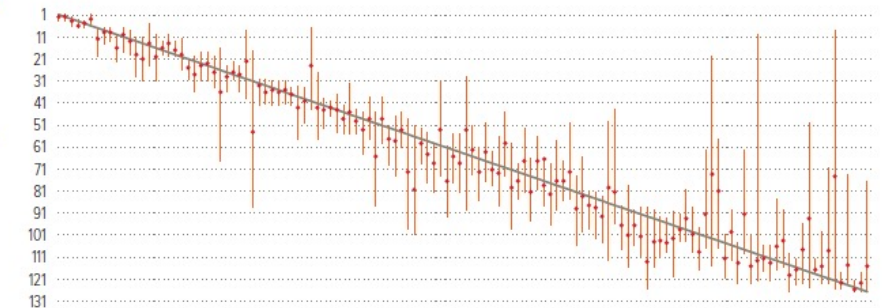
Figure 4.

## Robustness analysis of the Efficiency Ratio

$$\text{Efficiency} = \frac{\text{Output}}{\text{Input}}$$

- ▲ GII 2018 Efficiency ranks and interval of simulated ranks
- ▶ Countries/economies
- Median rank
- GII 2018 Efficiency rank

Efficiency Ratio rank vs. median rank, 90% confidence intervals



Source: European Commission, Joint Research Centre, 2018.

Note: Median ranks and intervals are calculated over 4,000 simulated scenarios combining simulated weights, imputation versus no imputation of missing values, and geometric versus arithmetic average within the Input and Output Sub-Indices. The Spearman rank correlation between the median rank and the Innovation Efficiency Ratio 2018 rank is 0.969



volatile "Efficiency Ratios"  
(advice: caution! => GII2019 removed)

# Index or Scoreboard?

**Composite Indicators** are aggregations of individual indicators compiled into a single score.

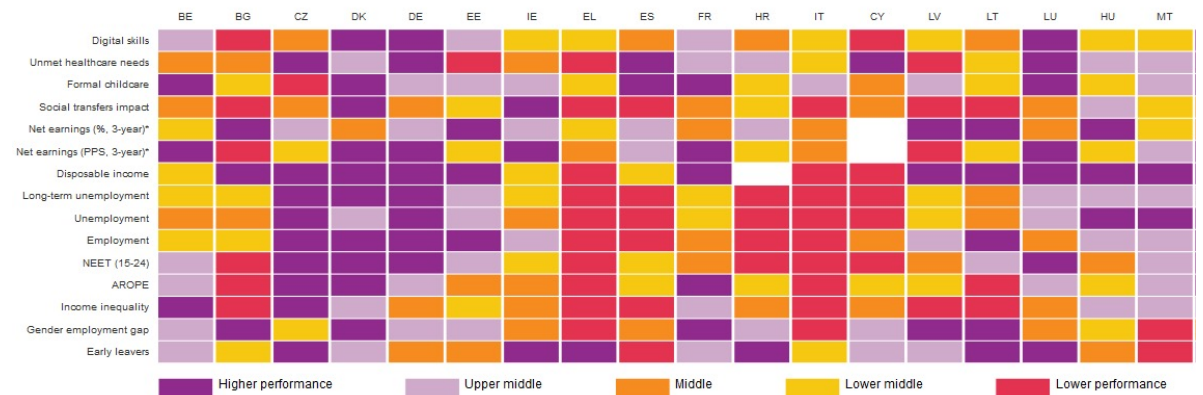
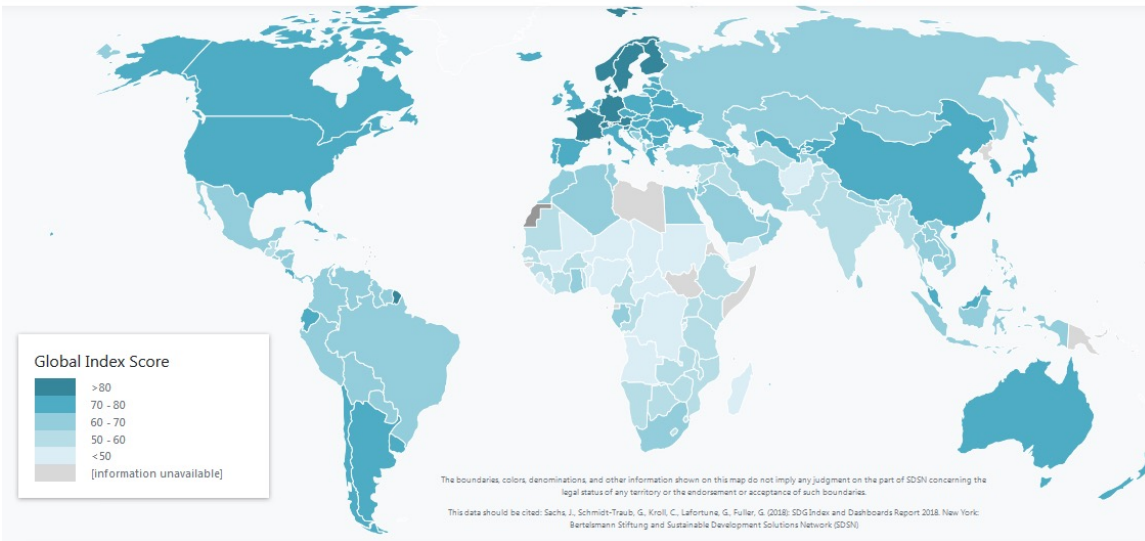
**Scoreboards** are collections of individual indicators that are related to a common concept.

## SDG Index and Dashboards Report 2018

Global Responsibilities: Implementing the goals



BertelsmannStiftung





# Social Scoreboard



- 3 dimensions & 12 areas
- 14 headline indicators
- 21 secondary indicators
- 93 indicators in total (gender/age)

[Source: Link](#)





# Social Scoreboard

Home

map

Country analysis

**Year heatmap**

Comparison table

Country heatmap

Time line

Profile

Select Year



Sort countries by performance

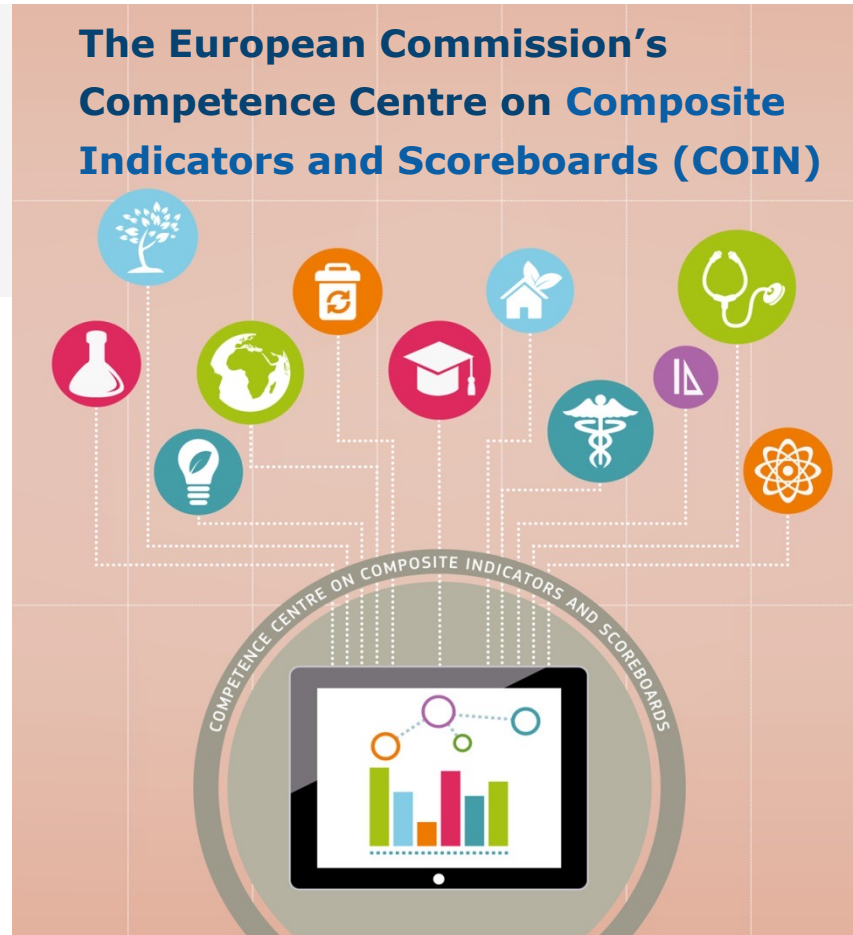
2016: 14 headline indicators



# Indices are powerful advocacy tools

*COIN helps to ensure that composite indicators are ...  
developed sensibly and used responsibly.*

- ✓ **'Sensible development'** of a composite indicator implies a quality control process based on both conceptual and statistical considerations.
- ✓ **'Responsible use'** calls for care in drawing conclusions and recommendations without taking into account the conceptual context in which composite indicators were developed.



*Powerful evidence based narratives supported by **good statistical measures** and **good analytic work** are a possibility which should not be left untried*

*We need **relevant** and **sound**...*



**(Composite) Indicators**

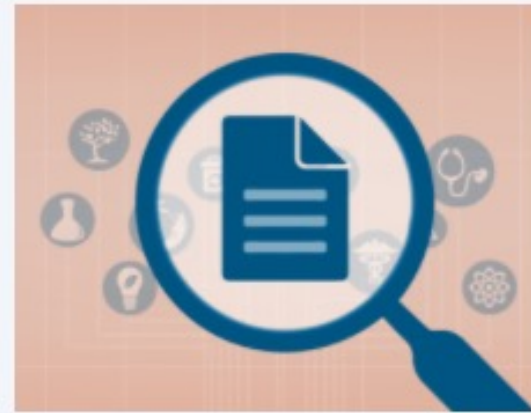




**Publications**



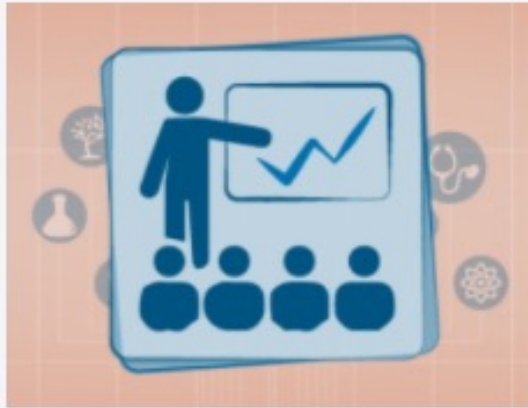
**Toolkit**



**Statistical Audits**



**Online platforms**



**Training catalogue**



**Projects**

# Thank you



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[composite-indicators.jrc.ec.europa.eu](https://knowledge4policy.ec.europa.eu/composite-indicators_en)

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# Further reading

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